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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/779,903

02/17/2004

Binling Zhou

TI-36355 (0437-A-293)

9629

23494

7590

12/07/2005

TEXAS INSTRUMENTS INCORPORATED

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EXAMINER

TON, MY TRANG

ART UNIT

PAPER NUMBER

2816

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

8

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/779,903	ZHOU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	My-Trang N. Ton	2816	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

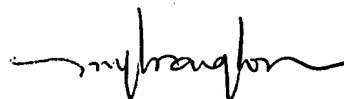
**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



**MY-TRANG NUTON  
PRIMARY EXAMINER**

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/17/04</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, “a plurality of analog-to-digital converters” (claim 12) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

Claims 12 and 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 12, the limitation "a plurality of analog-to-digital converters" is misdescriptive of the present invention since such limitation is not seen as recited therein. In order to avoid any confusion, Applicant is required to particularly point out how this limitation reads on the circuit arrangement of the drawings.

Claims 16-17 are similarly rejected as claim 12 regarding "the analog-to-digital converters".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art depicted by Applicant's Fig. 2 and further in view of Verhaeghe et al (U. S. Patent No. 5,479,132) (or Rapp (U.S Patent No. 5,280,420) or Jung (US 2005/0127885)).

The prior art discloses in Fig. 2 a conventional two-channel acquisition system including:

Regarding claim 1:

an input conductor for conducting an input current (lin);  
an amplifier stage (11) having an input (-) coupled to the input conductor (lin),  
an integrating capacitor (CINT) coupled between the input (-) of the amplifier stage (11) and an output (12) of the amplifier stage (11).

However, the prior art does not specifically disclose "an MOS capacitor" as recited in claim 1.

Verhaeghe teaches in Figs. 4B and 4C the well-known diagrams of capacitor-connected transistors that are used as capacitors. These types of capacitors are seen to be functionally equivalent, that is, they are both well known capacitor type. It would have been obvious to one of ordinary skill in the art at the time the invention was filed to substitute of one well-known capacitor for another. For example, substitute Cc of prior art with the capacitor connected transistor as shown in figs. 4b-4c of Verhaeghe.

The same motivation applied to Verhaeghe's reference is applied to Rapp or Jung's references. These implementations are preferred because MOS transistors are more efficiently implemented in silicon than capacitors and diodes with unconstrained terminals (see col. 7, lines 10-16 of Rapp) or (see fig. 3 of Jung).

Claim 2 is similarly rejected as claim 1: an input conductor (lin), a first amplifier stage (11), a second amplifier stage (13), an integrating capacitor (CINT). The same motivation applied to claim 1 regarding "an MOS compensation capacitor" is applied to claim 2.

The limitation recited in claim 3 is inherently seen in the prior art, Fig. 2.

Regarding claim 4: because the claimed structure is fully met by the prior art, the recited function will necessarily be inherent in the prior art, Fig. 2, as held by the court in *In re Best*, 195 USPQ 430.

Regarding claim 5: the input current (I<sub>in</sub>) is a photodiode current. Moreover, because the claimed structure is fully met by the prior art, the recited function will necessarily be inherent in the prior art, Fig. 2, as held by the court in *In re Best*, 195 USPQ 430.

Regarding claim 6: the first amplifier stage is a non-inverting amplifier stage (11) and the second amplifier stage is an inverting amplifier stage (13).

Regarding claim 7: the same motivation applied to claims 1 and 2 is applied to the limitation "the MOS compensation capacitor".

Regarding claim 8: the integrating capacitor is a poly capacitor (C<sub>INT</sub>).

Regarding claim 9: the limitation "a single-ended input signal" is seen to define intended use. The front-end integrators of the prior art is capable of using a single-ended input signal as recited. *In re Tuominen*, 213 USPQ 89 (CCPA 1982) & *In re Pearson*, 494 F.2d 1399, 181 USPQ 641 (CCPA 1974).

Regarding claim 10: the input of the first amplifier (11) conducts a differential input signal.

Regarding claim 11: the second stage amplifier (13) is an inverting class A amplifier.

Regarding claim 12:

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a plurality of integrator circuits (2A-1, 2A-2, 2B-1, 2B-2), each including: an input conductor (lin), a first amplifier stage (11), a second amplifier stage (13), an integrating capacitor (CINT). The same motivation applied to claim 1 regarding "an MOS compensation capacitor" is applied to claim 12.

a plurality of photodiodes (D-1, D-2);

an analog-to-digital converters (15). Due to indefiniteness, the limitation "a plurality of analog-to-digital converters" does not given sufficient weight to read over the prior art.

Claims 13 - 15 are similarly rejected as claims 3-5.

Regarding claim 16: the analog-to-digital converter is delta-sigma analog-to-digital converters (15).

Regarding claim 17: the input of the analog-to-digital converter (15) is coupled to common outputs (14) of groups of the integrator circuits (2A-1, 2A-2, 2B-1, 2B-2), respectively.

Claims 18-23 are similarly rejected as claims 6-11.

The method recited in claim 24 is similarly rejected as claim 1.

The method recited in claim 25 is similarly rejected as claim 2.

The method recited in claim 26 is similarly rejected as claim 12.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to My-Trang N. Ton whose telephone number is 571-272-1754. The examiner can normally be reached on 7:00 a.m - 5:30 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Callahan can be reached on 571-272-1740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



My-Trang N. Ton  
Primary Examiner  
Art Unit 2816

November 30, 2005